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by

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A THESIS
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The undersigned certify that they have read, and recommend
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thesis entitled:

GENESIS 0010: THE ELECTRONIC IMAGE

submitted by JUDITH MAXINE ARMSTRONG
in partial fulfillment of the requirements for the degree of Master of
Visual Arts.

The University of Alberta

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CHAPTER I

THE STATE OF NEW YORK

IN THE YEAR 1880

ALBANY: PUBLISHED BY THE COMMISSIONER

IN THE YEAR 1880

THE STATE OF NEW YORK

IN THE YEAR 1880

THE STATE OF NEW YORK

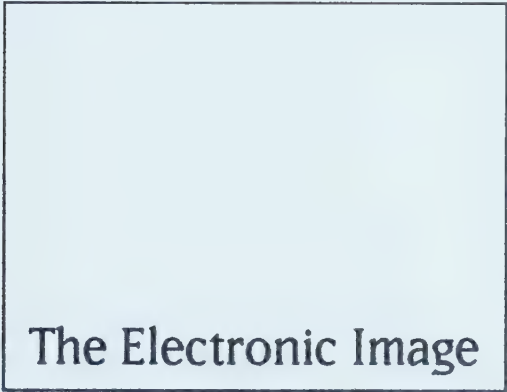
IN THE YEAR 1880

THE STATE OF NEW YORK

IN THE YEAR 1880



Genesis 0010



The Electronic Image

Genesis 0010

The Electronic Image

Background to the
thesis exhibition

In partial fulfillment for
Masters of Visual Arts
from the
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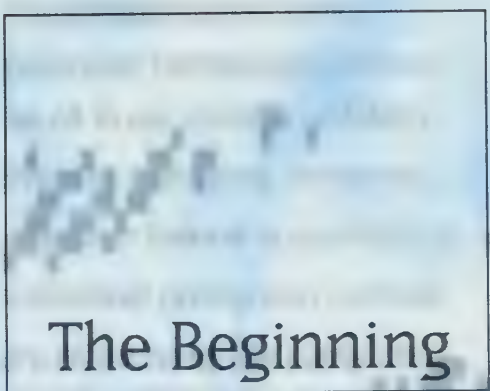
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Typeface: Matrix, designed on the computer by Zuzana Licko

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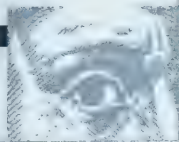


Part I The Beginning



The Beginning

The introduction of new electronic technologies affects us all in our careers and daily lives. As a designer, becoming computer literate is essential as traditional production methods are replaced by the computer.



It is for this reason that I began familiarizing myself with this new tool.

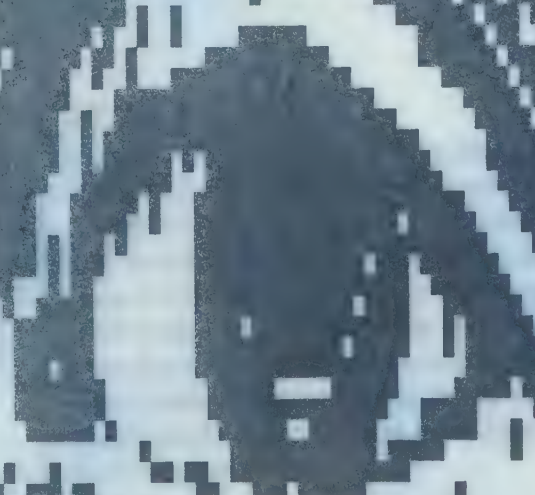
It is much more than a simple guide to what is provided me with a medium that enhances my creativity.

My images have often been a collage of unrelated images combined in a new context to create a new meaning. This is the essence of my work.

The computer's power allows me to afford to combine images, combine them in a new way, change the image by colouring, using a variety of techniques. There are endless possibilities. This new technology has

opened up a world that seemed to have no limits. The production of the computer has been a revelation for hours familiar with the potential. The computer is a powerful tool of this power.

Part 1 The Beginning





The introduction of new electronic technologies affects us all in our careers and daily lives. As a designer, becoming computer literate is essential as traditional production methods are replaced by the computer.

It is for this reason that I began familiarizing myself with this new tool. I found the computer to be much more than a new tool replacing old technologies, **it provided me with a medium that stimulates my creativity ■**

My images have often been a collage composed of several appropriated images combined into a new context to communicate a message by photocopy or photography.

The computer allows me to hybridize images effortlessly. I can collect an electronic library of images, combine them seamlessly, change the quality of the image by colourizing, tracing, stretching . . . there are endless possibilities. This new freedom brought to me a medium that seemed to have no boundaries. The seduction of the screen kept me experimenting for hours familiarizing myself with its potential. This project explores the creative potential of this powerful tool and

demonstrates a personal visual language that I have developed through this exploration. The changes the computer is bringing to our profession plus the search for a theme for my exploration of the computer medium, drew me to study the effects of new technologies in the history of communications. How was society affected by technological developments?

The introduction of the computer parallels Gutenberg's invention of movable metallic letters and the printing press in the middle of the 15th century.

The press and the computer have brought immense changes in production methods, replaced old tools with new, increased accessibility of information and introduced new modes of communication. Each represents a 'Genesis' in the history of communication.

Gutenberg's press in the 15th century being Genesis I and the computer being Genesis 0010

the binary code
for the number 2
in digital language

I have used Genesis as a theme for my images not only because of this historical significance but also because the first book printed by Gutenberg was the bible.



Genesis 1

It's not very
far from the
Gutenberg press
of movable bits
of type to the
logic 'bits' of
the computer.

Genesis I

**It's not very
far from the
Gutenberg press
of movable bits
of type to the
logic 'bits' of
the computer.**

the computer.
logic 'bits' of
of type to the
of movable bits
Gutenberg press
far from the
It's not very

Genesis I

The invention of printing is the greatest event in history.

*It is the mother of all revolution,
a renewal of human expression from its very basis.*

*Printed thoughts are everlasting,
provided with wings,
intangible and indestructible.*

*They soar like a crowd of birds,
spread in all directions
and are everywhere at the same time.*

Victor Hugo

The Origins of Print

(print) v.t. to impress; to reproduce words, pictures, etc. by pressing inked types on paper, etc.; n. an impression or mark left on a surface by something pressed against it; printed fabric; printed lettering; an engraving. (Webster's Dictionary)

The exact date of the origin of the Art of Printing is unknown. But the Chinese appear to have been using a relief printing technique from wooden blocks since ca.500 A.D. "that the art was known and practised by the Chinese at a period still more remote, we learn from the 39th volume of the Chinese Encyclopedia, where we are informed, that on the eighth day of the twelfth month of the thirteenth year of the reign of Wen-ti, founder of Soui dynasty (593) it was ordered by a decree to collect the worn out drawings and inedited texts, and to engrave them on wood and publish them. This fact is confirmed by various Chinese writings; and this, continues the work quoted, was the commencement of printing upon wooden blocks." "The material to be printed was transferred to a transparent sheet that was glued face down onto a wooden block. When the paste was dry, the paper was carefully removed leaving a faint reversed imprint

¹
Skeen, W. Typography, or Letter Press Printing in the Fifteenth Century: A Lecture on the Origin and Early History of the Art. Government Press, Colombo, Ceylon, February 24, 1853, pg., 4.

of the image. The blockcutter then carved away the surface around the inked image, leaving the letterforms in high relief. Once the blocks were ready and paper cut "one man could run approximately 2000/3000 sheets per day."²



Gutenberg

The idea of printing in the modern sense, using metallic moveable letterforms was first attempted by Johannes Gutenberg ca.1435. The Chinese had experimented with movable type ca.1023-1063 producing letterforms by cutting them from thin clay and the Koreans in 1403 A.D., experimented with bronze movable type. The technique was not very popular because of their writing system that uses thousands of characters. The western alphabet that relies on only 26 characters was very much suited to reusable moveable type.

■ The increased interest and consequential demand for the accumulation of knowledge during the Renaissance, motivated Gutenberg to realize his invention that he had already been experimenting with, movable metallic letterforms. Initially he produced the letters of

wood finding that the method was not only time consuming and expensive, the material was too fragile to be used for multiple printings. As a solution Gutenberg produced type made of metal. He cast the letterforms in a mixture of lead, antimony, tin and bismuth. This mixture contracted when cooled allowing for ease of removing letterforms from the cast. Each individual letter was made to have the same plane parallel in every direction and the same height. The similarity in height provided an even amount of pressure on each letter during printing. The skill Gutenberg acquired during his apprenticeship as a goldsmith became invaluable when experimenting with metal type and metal combinations.

The art of printing is indeed a sort of Messiah amongst inventions.

 Mirza Huharrem

**Through you, oh Gutenberg,
citizen of Mainz, the sciences
blossom. Knowledge caught
fire through the power of
your divine spirit, spread on
all sides and penetrates with
beneficent light everything
from the lowliest hut to the
palace of gold.**

Georg Christoph Lichtenberg

■ Some of Gutenberg's first printed pieces are believed to be the calendar for the year 1448, an almanac and several editions of Latin Grammar by Donatus. The first book Gutenberg printed, the forty-two line Bible has been quoted as, "an example of fine typography, the earliest book printed with movable types, the forty-two line Bible of about 1455, has never been surpassed."³ On the question of quality, a comparison of the printed works before the Bible show a perfection of the letterform shape that imitates the hand drawn letterstyles used by Medieval scribes. The printed word maintains the quality of workmanship that the scribes had perfected. The Middle Ages brought calligraphy to perfection, and it was natural

3
Wynkyn de Worde Society, "The Revival of Art in Craft", In association with the William Morris Society, Essays from the volume Arts and Crafts by members of the Arts and Crafts Exhibition Society, first published 1893, commentary 1968, pg., 8.



therefore that the forms of printed letters should follow more or less closely those of the written character. William Morris is quoted as stating that "the Gutenberg Bible, is printed in letters that are an exact imitation of the more formal ecclesiastical writing obtained at that time."⁴ Elizabeth Eisenstein notes that "if one holds a late manuscript copy of a given text next to an early printed one, one is likely to doubt that any change at all has taken place, let alone an abrupt or revolutionary one."⁵

⁴
Ibid., pg., 20.

⁵
Eisenstein, Elizabeth, The Printing Press as an Agent of Change Communications cultural transformations in early-modern Europe, Volume I, Cambridge University Press, Cambridge, 1979, pg., 51.

The Print Shop

Lack of change in the appearance of the printed page overshadowed the complete change in production. This new process brought a change in structure to the profession. "The advent of printing led to the creation of a new kind of shop structure; to a regrouping which entailed closer contacts among diversely skilled workers and encourage new form of cross-cultural interchange."⁶ The scribe acted as one specialization among many, stationers, lay copyists, illuminators, miniaturists, goldsmiths, leather workers, preachers,

⁶
Ibid., pg., 51.

(who would compile books of sermons), and humanist poets (who serve as their own scribes). The new key figure, the Master Printer, would now hire these people of different specialities to work at his print shop, bringing about a "new interplay between diverse occupational groups. The preparation of copy and illustration material for printed editions led to a completely new rearrangement of the book making arts."⁷

7
Ibid., page 55

■ The new technology also caused new specializations and eliminated old ones. "Typefounding which includes the punchcutter, matrix maker and mold maker, was a new profession that was a product of the press sealing the fate of the scribe."⁸ The presses required specialized tools, new ink technologies and tradesmen. The new "print shop" imposed a capitalistic atmosphere on the monastery that was disturbing. "It has been suggested indeed that the mere act of setting up a press in a monastery or in affiliation with a religious order was a source of disturbance, bringing a multitude of worries about money and property into space previously reserved for meditation and good works."⁹

8
Ibid., pg., 54.

9
Ibid., pg., 58.

The accumulation of property as mentioned in the previous quotation is of interest. The scribe relied only on his ink, pen and paper. He produced his works in a meditative atmosphere conducive to religious thought. The press required a multitude of equipment and was of extreme expense. Emphasis was placed on accumulation of equipment and the technology of producing the word. Does this not take the word of God represented on the page away from its holy place?

■ The new technology brought an interest in the potential for the new end uses of printed materials. The possibility of producing literature other than religious materials was pursued. The new availability of knowledge the book allowed produced a demand by the public for publications on the general sciences, trades, circulars, sales catalogues etc. Printers focused more attention on the needs of the reader. They advertised their publications as having "more readable texts, and complete and better arranged indexes. A variety of type sizes, running heads, footnotes, table of contents, and title pages were some new ways of ordering information."¹⁰ Printers were

habente credendi: et nō suspic-
torem mortis. Et si acciderit
lum noli aliquid committere: n-
auffat vitā tuam. Communi
mortis scire: quoniam i iudicio li-
ingredieris: et sup dolentiū ara-
bulabis. Secundum virtutē tua-
ue te a primo tuo: et cum sapi-
et prudentibz tracta. Viri iusti
bi conuine: et in amorē dī sit ri-
riatio: et in sensu sit tibi cog-
dei: et omnis enarratio qua u-
ptis altissimi. In manu artifi-
ra laudabuntur: et princeps
in sapientia seniores sui: in si-
ro seniorum verbum. Terribili
ciuitate sua homo linguae suae:
rarior i verbo suo odibilis ei
Iudex sapiens iudicabit pplm si
priat? Terribilis stabili rōr.
Iudicau ppli sic et minister ei?
lis rōr est ciuitatis: tales et i
tautos in rā. Reg insipiens pd-
suū: et ciuitas inhabitabit
sui prudentiū. In manu dī p-
are: et terribilis omnis in-
gratiū: et valent rōrem in p-
bit sup illam. In manu dī p-
hominis: et sup faciem scribe u-
honoru sui. Omnis iniurie
ue manentis: et nichil agas i
iniurie. Odibilis corā dō ē et
bus supbia: et terribilis ois i
gentiū. Regni a gāt i gentē et
propter iniusticias et iniurias
nichas et diuersos dolos. Au-
reni nichil est salutare. Quid
terra et cinis? Nichil est iniqui
amare precium. Vir tū et aīo
umalem habet: quoniam in u-
proicit inānia sua. Omnis
breuis vita: languor plixior

¹⁰
Ibid., pg., 52.

striving to improve legibility and ease of accessing information for the reader to make the books produced in their print shop the most desirable. Title pages were used as advertisements, which often included the printers trademark, providing a visual identity that the public then associates with a particular print shop.

■ The press imposed the necessity for the standardization of language. Many languages were used throughout Europe of which four "Latin, Greek, Germanic, and Slavonic"¹¹ were chosen as the standards. The necessity for standardization brought an interest in the study of language and standardization of speech. The result, a stronger sense of nationalism. "The sciences of grammar establish themselves, languages become distinct and well-founded, and the sense of nationalism emerges."¹²

11

Hogben, Lancelot, From Cave Painting to Comic Strip. A Kaleidoscope of Human Communication, Chanticleer Press, New York, 1949, pg., 167.

12

Rivano, Juan, The Ideas of Marshall McLuhan, Council on International Studies, State University of New York at Buffalo, 1979, pg., 5.

Typography extended its character to the regulation and fixation of languages . . . Print altered not only the spelling and grammar but the accentuation and inflection of languages, and made bad grammar possible.

Marshall McLuhan

■ The transmission and storage of information no longer relied on the spoken word. The portable private book allowed for a transfer of information that allowed people to teach themselves. Knowledge was now accessible to everybody. "Reliance on apprenticeship, oral communication, had gone with the mastering of letters in the age of the scribes."¹³ Learning by reading began to replace learning by memorization of mnemonic aids. Rhymes and cadences were no longer necessary to remember formulas etc. This brings about two very significant changes in the history of communication. The change of information being transmitted by the acoustic, oral sense to the visual sense and as a result, the retrieval of information by individuals rather than in a

¹³ Eisenstein, Elizabeth, The Printing Press as an Agent of Change: Communications cultural transformations in early-modern Europe, Volume I, Cambridge University Press, Cambridge, 1979, pg., 66.

group, thus creating a society based on individualism and specialization. "Print radically reshaped the sensibility of Western man; for whereas the medieval man saw experience as individual entities - as a collection of separate segments - and assimilated his environment primarily by ear, representative man in the Renaissance emphasized the eye and saw life as he saw print - as a continuity, often with causal relationships . . . the printed book, by enabling people to think in isolation, encouraged individual revelation."¹⁴

¹⁴ Kostelanatz, Masterminds,
"Marshall McLuhan: High
Priest of the Electronic Village",
pg., 86.

The interiorization of the technology of the phonetic alphabet translates man from the magical world of the ear to the neutral visual world . . . The portability of the book, like that of the easel-painting, added much to the new cult of individualism.

Marshall McLuhan

Towards Genesis 0010

For the next 500 years technical improvements to Gutenberg's invention developed and typographic exploration continued. The mode of communication, the printed word, involving one sense, the eye, did not change.

■ The invention of the television in 1934

was a key technology that began the evolution to the second most important phase in the history of communications since Gutenberg's press, the Genesis 0010 of communications. In *Understanding Media*, McLuhan suggests that "electronic technologies of communication - telegraph, radio, television, movies, telephones, computers - are similarly reshaping civilization and sensibility in the twentieth century. Whereas print-age man visually perceived one thing at a time in consecutive sequence - like a line of type - contemporary man experiences numerous forces of communication simultaneously, sometimes through more than one of his senses."¹⁵ Television provides an environment where text and image are viewed consecutively. The influence of this new marriage of

¹⁵
Ibid., pg., 86.

text and image also can be seen in various pieces of print produced post TV. "The close interrelation of text and illustration is a direct consequence of our changed reading habits through television. WET pages are not read but viewed. The eye scans the page, picking out a headline here, a photograph there, reading a few lines, skipping over longer paragraphs, settling into a normal linear reading pattern only if a strong interest is aroused during the scanning process."¹⁶

16

Bartl, Peter, "Sensuous Wet
Typography", X-Height, #4,
1981, pg. 5

■ With radio, television, and movies came digital information. In 1928 a teletypesetting machine (TTS) transmitted data to different cities by copy being tapped on a keyboard that perforated a narrow strip of paper. The tape could be used to cast slugs automatically or to transmit electrical impulses, by radio or wire, to another receiver. In 1946 phototypesetting was invented, although widespread use of it was not until the late 1960's. Phototypesetting produces characters on film or paper with an analogue electrical signal. The first graphic image on Computers, Ocsillons (electronic abstractions) were produced by Ben F. Laposky in 1950. In 1965 the Sony hand held video

camera was introduced on the market and by 1973 analogue information could be converted to digital form (for commercial market only). 1967 marked the year when the first letterforms could be stored in digital form and viewed on a monitor using the CRT (Cathode Ray Tube) phototypesetter.

■ **These initial breakthroughs provided the foundation for the electronic environment necessary for Genesis 0010.** Early

experimentation and developments with computers required large extremely expensive mainframe computers, as well as scientists, mathematicians, and engineers who had the technical skills necessary to master the 'mysterious' machine-user dialogue. Artists questioned computers as a new medium for fear that "they would usurp artistic creativity and control"¹⁷ To visualize an image an artist had to rely on the programmers interpretation of the image and also his level of programming skill.

■ "One of the most well known computer artists participating in this type of collaboration is David Em, artist-in-residence at the California Institute of Technology Jet Propulsion Laboratory for the last ten years. There he has had

¹⁷
Goodman, Cynthia, Digital Visions: Computers and Art, Harry N. Abrams, Inc., Publishers, New York, Everson Museum of Art, Syracuse, 1987, pg., 14.

access to the programs and knowledge of James Blinn, a pioneer in computer graphics for scientific purposes and creator of the hyper-realistic computer graphic simulations of the spacecraft Voyager 1 passing Jupiter. David Em creates futuristic, surreal landscapes with similar programs by Blinn that were originally designed for NASA and often contain visual data transmitted from outer space. While Em's artwork is undeniably beautiful many critics lament his attachment to a distinguishable computer system and specific type of software and feel that the content of the images also reflects too closely Blinn's input."¹⁸

¹⁸

Bradley, Lori, "The potential of Computers in the Visual Arts", Artpapers, Volume 12, Part 5, Sept/Oct 1988, pg., 36.

■ Low resolution output devices (dot matrix) did not allow for a choice of visual language. "The presence of the computer in the form of pixels and the matrix, distinguishable in some images, was thought of as a metaphor for implications of technology in society even if the images were not intended to reflect that content."¹⁹

¹⁹

Ibid., pg., 37.

■ Advances in electronic technology, the introduction of the microcomputer and advanced software in the last decade began to address some of these limitations. In 1981 IBM

announced their microcomputer based on the Intel 8088/86 chip and in 1983 Apple Macintosh introduced their microcomputer based on the Motorola 68,000 chip. The invention of the microcomputer is a parallel to Gutenberg's invention that made knowledge affordable and available to a great number of individuals (Genesis I). The microcomputer and subsequent software developments, made it possible for society to access and communicate in digital language. Computers and the electronic environment that they provide, liberates man from the linear thinking that print promotes, into a world where continuous multi-dimensional processes and thinking is embraced. All forms of information, language, image, sound, are stored in the same binary language. "010011101001001 This binary code translates into the number, 047221, it could as well represent sixteen dots on a television screen or letters of a text or a fragment of an audio wave form. Bits can be shifted around in digital systems, performing tasks of logic and manipulation and performing processes with images, sounds and words. This digital bit storage principle is probably among the



010011101001001
010011101001001
010011101001001

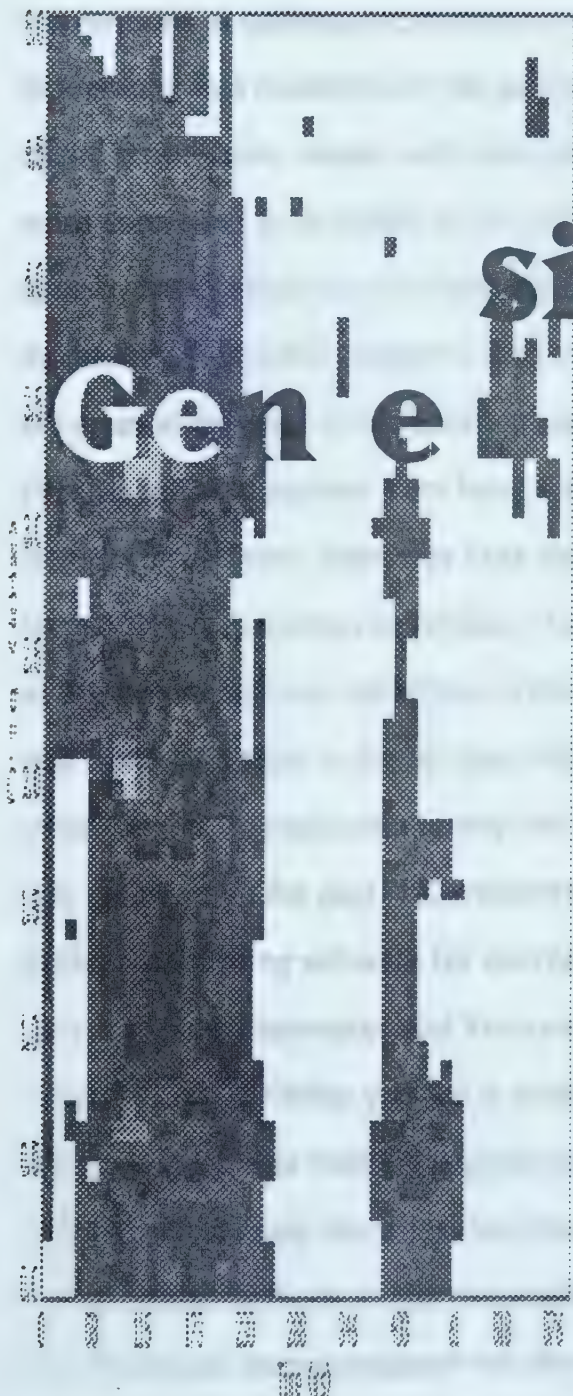
Whitney, John, Digital Harmony: On the Complementarity of Music and Visual Art, Byte Books/A McGraw-Hill Publication/Peterborough New Hampshire, 1980, pg., 35.

century's greatest innovations"²⁰ The microcomputer, software that provides an interface between the computer and operator, plus the binary language computers are based on, in combination, denotes Genesis in the History of Communications.

The computer is a universal machine that can contain and become all media. I think that the disillusionment felt by people hoping the computer would make available a new electronic art form will give way to the realization that the microcomputer can give us new forms through its strength in containing, combining and becoming all media.

Gene Youngblood

100 :	100 :	100 :
100 :	100 :	100 :
100 :	100 :	100 :



sis

0010

Gen e



0100 0010

The Electronic Desktop

Most new technologies' initial developments mimic the previous technology that they are replacing. "Print, in its infancy, emulated the conventions of calligraphic writing on vellum; typography was modelled on the penmanship of the scriptorium; images and color embellishment continued to be added to the printed page by hand, emulating the methods of the monastery."²¹ Initially designers used computers as an alternative to traditional typesetting. Parallel to the transition from hand scripted letterforms to print, there was little change in form only in production technique. "As we look at the transition from metaltype to phototype, and from phototype to digital type, technology initially tends to replicate the way the product was delivered in the past."²² Developments in desktop publishing software for microcomputers such as Pagemaker and Ventura Publisher, WYSIWIG (What you see is what you get) interfaces, and Postscript (page description language) made the transition from conventional methods to electronic attractive. The Macintosh microcomputer was the leader

21

Cooper, Muriel, "Computers and Design", Design Quarterly, #142, pg., 4.

22

Pfiffer, Pamela, "1991 Type Roundtable", Publish, June 1991, pg., 58.

in producing a "user friendly" select and click method of communicating with the "brains" of the computer and therefore became widely used in the graphic community. Designers who made the switch from traditional to electronic techniques soon began expressing criticism of electronic desk-top publishing; there was a lack of typographic control when compared with traditional typesetting, poor quality work was produced because of the "untrained operator" having access to desktop-publishing. There was a lengthy learning curve and unsolvable bugs in software using unbearable amounts of what some called 'wasted time'. These problems prevented many designers from switching from traditional typesetting methods to electronic.

"Visions of bold-outline-shadow Helvetica
"Mac" tricks have sent many graphic designers running back to their T-squares and rubber cement"²³ Communication between software companies and designers improved typographic control in software updates which had fewer and fewer "bugs". Designers were again converting from phototypesetting to electronics. The electronic desktop became an attractive alternative both artistically and economically.

²³ VanderLans, Rudy and Zicko, Zuzano, "The New Primitives" ID, March/April, 1988, pg. 58.

Yet there was still a "fear" in the community as to what accessibility of desk-top to "the uninitiated" would do to design. "Accessible and affordable graphics computers like Apple's Macintosh system have created a new marketplace for design. These tools are exposing laymen to design in a hands-on fashion and in the process, are perhaps revealing to them the complexities of a designer's task. Yet these systems, with their promises to transform any amateur into a desk-top publisher, have further alienated graphic designers from advanced technologies. Most designers find computers alien to use and are dismayed at current desk-top publishing designs. Now more than ever, the professional community must overcome this mistrust in order to affect the evolution and ensure the standards of computer graphic systems."²⁴

²⁴
VanderLans, Rudy and Zicko, Zuzano, "The New Primitives", *ID*, March/April, 1988, pg., 58.

A New Product

Does the availability of the desktop to the public have an effect on the type of consumer we work for or the type of work we will be doing in the future? There will always be consumers who want to produce their own publications. That is why we should be involved in the development of the software they use. Software and the templates provided with them allow a framework to work within allowing the autonomy to choose formats appropriate for their end use. There is potential for a new product and approach to design that the microcomputer fosters. We have in the past viewed the "product" that we produce as a physical object. Designers whose idea of the product as "solely a physical entity is an illusion of the mechanistic era that can no longer be sustained in an age preoccupied with information . . . the designers role in the post-mechanical era is to make the design process equally accessible to everyone."²⁵ Clients potentially will pursue a designer to produce a template that they can plug into their software and use for their publication.

"Once designing becomes more interactive, once it is based on powerful miniaturized information tools, once it is in the hands of less professionally qualified users, what is to stop consumers themselves from designing what they consume?"²⁶ Thinking of design as a process unveils a new market and a new kind of product which understands design to be a continuous process which involves the designer and client. Imageland, a design studio in Los Angeles has designers "sit down at their computers with clients, making them active participants in the design process."²⁷

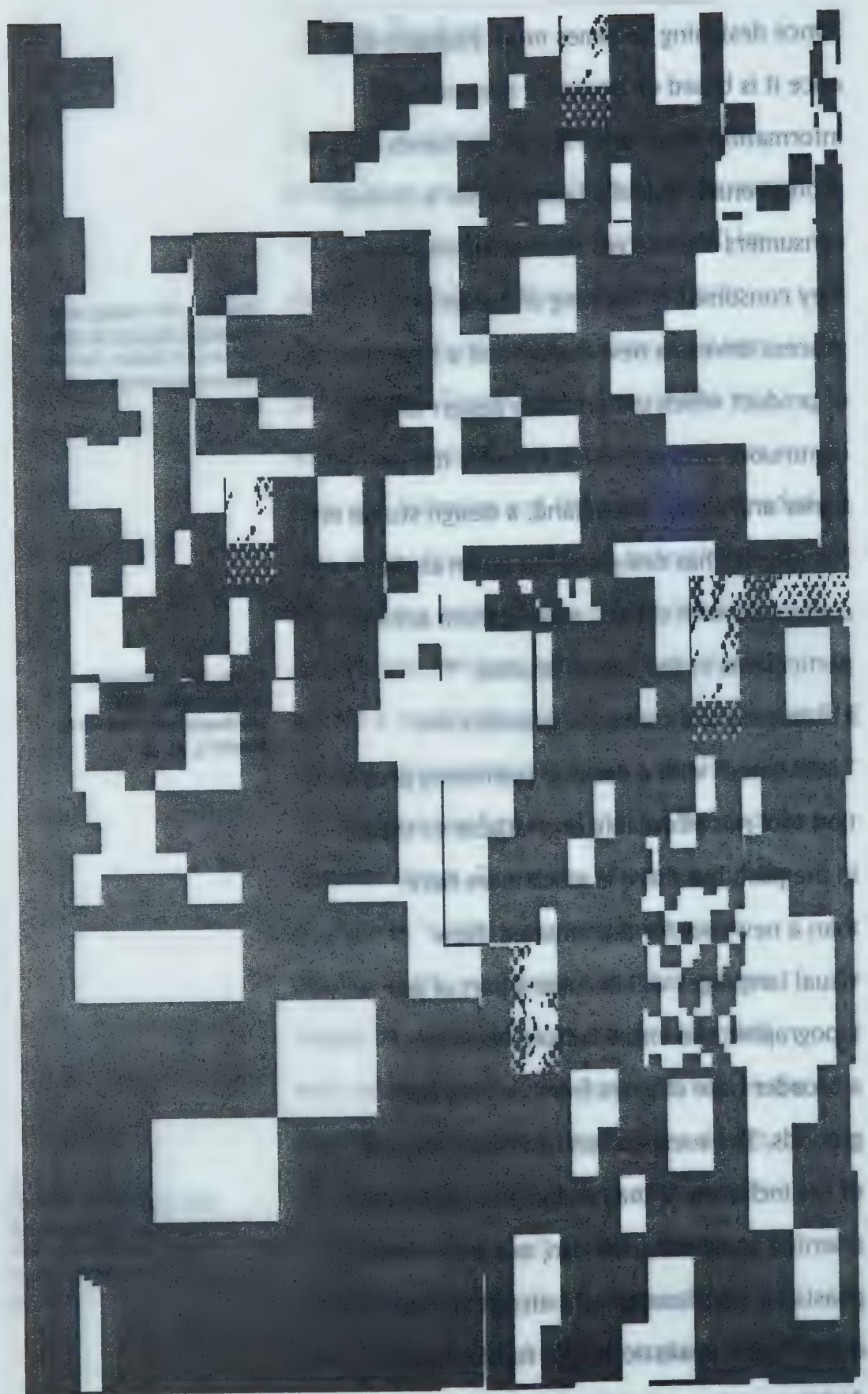
26

Thackara, John, Design after Modernism Beyond the Object, Thames and Hudson, German Democratic Republic, 1988, pg. 214.

27

Knapp, Pat, "Electronic Environments", HOW, July/August 1991, Volume VI, Number 5, pg. 34.

■ Ultimately the computer provides the "uninitiated" with a desktop publishing production tool not affordable or available to them in the past, but there is much more here than a new tool for the initiated. New visual languages will become a part of our typographic and visual culture because of a broader base of users from varying backgrounds. The socialization of design because of the inclusion of the consumer in a process oriented approach to design, and a new emphasis on visualization as a discipline that can create hyper-realistic images for consumer, designer, artist and scientist.



Part II

Creation

COLLEGE

PART II

Defining Genesis

The first chapter of Gutenberg's Bible, Genesis, is composed of 31 verses that discuss the creation of the world as we know it. Each verse covers a different category of creation, for example verse 1, "In the beginning God created the heavens and the earth." I have divided the contents of Genesis into several subjects that developed into themes for my images. They are as follows: beginning, heavens, earth, darkness, light, waters, day, night, sky, plants, trees, fruit, seed, seasons, male and female.

Material Collection

I first began collecting sounds, motion, and images from the physical world that is a part of my daily life. These were recorded using two different mediums, photography, both slides and prints for stills, and videotape for motion and sound. Images were also collected from reference materials, mostly by photocopier. Photographic and photocopied images were scanned and video images captured,

collapsing different media into a universal digital language. During this process I discovered there was another layer of images available because of the technological capabilities of the computer. Computers with graphics are being used to visualize aspects of our universe that we previously could not see. "The invention of the computer, like that of the telescope and the microscope before it, expands not only the range of our senses but our vision of the universe."²⁸

28

Deken, Joseph, Computer Images, State of the Art, Stewart, Tabori and Chang Publishers, Inc., New York, 1983, pg., 35.

■ Computed Tomography (CT scan) "visualizes a single slice through the body, a two-dimensional image. Adjacent slices also can be calculated and "stacked up" into a three-dimensional image of the body's interior.

Through the techniques of computer graphics, this data can be used to create a three-dimensional computer-graphic model of body structure."²⁹ The PET image (Positron Emission

Tomography) "visualizes metabolic activity.

It is, therefore, an image of biological function rather than structure . . . glucose-like molecules are made radioactive and, thus, make images which visualize glucose metabolism."³⁰

Magnetic Resonance Imaging (MRI), like

29

Friedhoff, Richard Mark, Benzon, William, The Second Computer Revolution, Visualization, Harry N. Abrams, Inc., New York, 1989, pg., 64.

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Ibid., pg., 66.

CT scans are used to visualize internal structures. The difference is "that it has a higher resolution and it is more sensitive to soft tissue detail. MRI uses magnetic fields and pulses of radio waves to detect the distribution of hydrogen atoms in the body."³¹ Symmetrized Dot-Patterns (SDPs) are being used in representing heart sounds. "The symmetrized dot-pattern display can be used to visualize normal and pathological heart sounds."³² In biochemistry scientists use computers to visualize a molecule's "conformations".

³¹
Ibid., pg., 67.

³²
Pickover, Clifford A., Computers Pattern Chaos and Beauty: Graphics from an Unseen World, St. Martin's Press, New York, 1990, pg., 42.

"Scientists can evaluate many possible amino-acid sequences to find one that would naturally conform to the desired shape."³³ Spectrograms are used to visualize sound waves that are measured in intensity and frequency of sound. Mathematicians use "computers with graphics to produce representations of data from a number of perspectives and to characterize natural phenomena with increasing clarity and usefulness. . . Mathematicians couldn't solve it until they could see it!"³⁴

³³
Friedhoff, Richard Mark, Benzon, William, The Second Computer Revolution, Visualization, Harry N. Abrams, Inc., New York, 1989, pg., 36.

³⁴
Pickover, Clifford A., Computers Pattern Chaos and Beauty: Graphics from an Unseen World, St. Martin's Press, New York, 1990, pg., 7.

■ These images produced for science began to have a great significance for me, not only because of their visual beauty but also because

of their close connection to Genesis. They took me from the physical world described in Genesis that I can touch and see with my eyes, through millions of layers to a much closer microscopic look at images of Genesis.

I collected CT scans, bone scans, MRI's and PET's from the Department of Radiology and Diagnostic Imaging at the University of Alberta Hospital, Spectrograms from the Department of Linguistics, and visualizations of the DNA molecule from the Department of Biochemistry. These were transformed into digital language either by video capture or scanning.

"Implode - to burst inward. This definition captures the spirit and dynamic of the digital revolution and its profound impact on existing disciplines, graphic design among them. I say 'among them' advisedly, since the broad effect of this revolution is to bring many things much closer than they have been since the industrial revolution made specialists of us all: idea and realization, producer and client, creation and revision, word, image, sound, movement.

In short, digital technology is no respecter of existing boundaries. Whether spatial, temporal, conceptual or professional."³⁵

Hybrids

It is significant to me in my work to illustrate the universality that the computer medium promotes. There are no boundaries, all mediums become one universal digital metamedium. This universality is not only significant because of transfer of images across specialities but also because it crosses international borders. We "all" use a common universal digital language. "The family circle has widened. The worldpool of information fathered by electric media - far surpasses any possible influence mom and dad can now bring to bear. Character no longer is shaped by only two earnest, fumbling experts. Now all the world's a sage."³⁶ Appropriating images from their original source and placing them in a new context is important to my images.

A renewed interest in the sheer beauty of the image as well as a new semantic significance is motivated because of its new context.

Digital conversion of images from different sources produces unique textures that I find inspiring visually especially when juxtaposed. The texture of an image captured from



36

McLuhan, Marshall, *The Medium is the Message*, Random House Inc., New York, 1967, pg., 14.





videotape as opposed to an image scanned from a 35mm slide is very different. The artist is given control over the use of these textures by choosing to use high resolution input and output devices. When an image is scanned at high resolution the bitmapped pattern is invisible unless the artist chooses to emphasize it. In many of my images I choose to juxtapose areas of magnified digital patterns to high resolution areas as a means to emphasize the process the computer uses to generate an image. It is natural that this new language is emphasized in my work. Bitmap patterns are results of the same binary language that is universal to all forms of digital information in our information age. When outputting images to hard copy I often choose a larger scale than the original size the image was composed. This allows for further amplification of the digital texture characteristic of the computer medium and further magnification into bitmapped patterns that create the image. Choices of different materials to print on can be used to emphasize certain qualities of the image, for example textiles versus textured watercolour paper versus high gloss paper.

■ The computer as a medium for production of my images has allowed me to develop my collage like working method beyond what I could have ever accomplished by using traditional methods. "The value of the computer for artists lies not in its ability to mimic what man can do, but in providing a means for man to accomplish artistic endeavours that ordinarily lie beyond his technical scope."³⁷ Most importantly the computer medium has a strong ability to stimulate my creativity as an artist.

Sometimes Art is Designed Sometimes Design is Art

The question of what is art and what is design becomes significant in the context of my work, because my images begin to cross the path of graphic design into the realm of art. What is Design? "Design is a process of purposeful visual creation. Unlike painting and sculpture, which are the realization of artists' personal visions and dreams, design has to be placed before the eyes of the public and to convey a predetermined message."³⁸ A Graphic Designer is "an artist who specializes in the design of

37

Bradley, Lori, "The Potential of Personal Computers in the Visual Arts", Artpapers, Volume 12, Part 5, Sept/Oct 1988, pg., 38.

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Wong, Wucius, Principles of Two-Dimensional Design, Van Nostrand Reinhold Company, New York, 1972, pg., 5.

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Meggs, Philip B., A History of Graphic Design, Van Nostrand Reinhold, New York, 1983, pg., 494.

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Allee, John Gage, Websters Dictionary, Curtis Circulation Company, 1971, pg., 104.

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Knobler, Hathan, The Visual Dialogue, Third Edition, An Introduction to the Appreciation of Art, Holt, Rinehart and Winston, New York, 1980, pg., 18.

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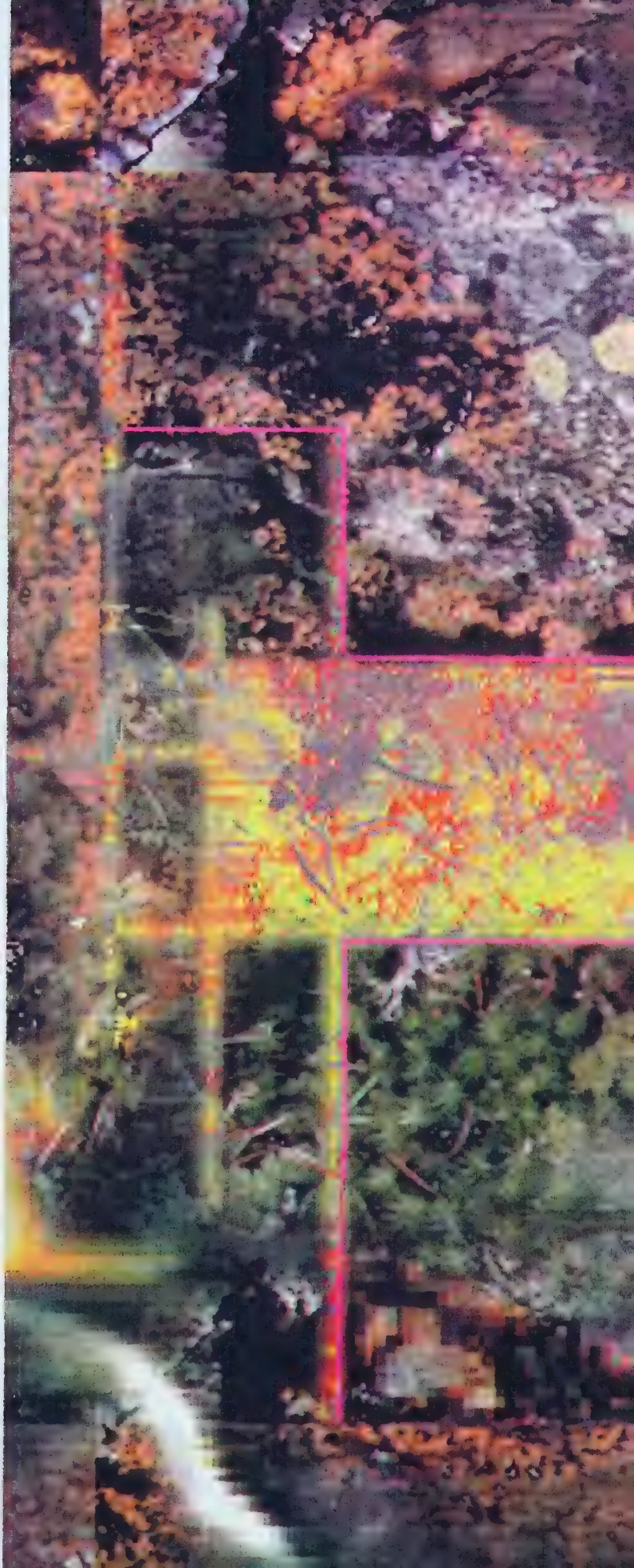
Ibid., pg., 24.

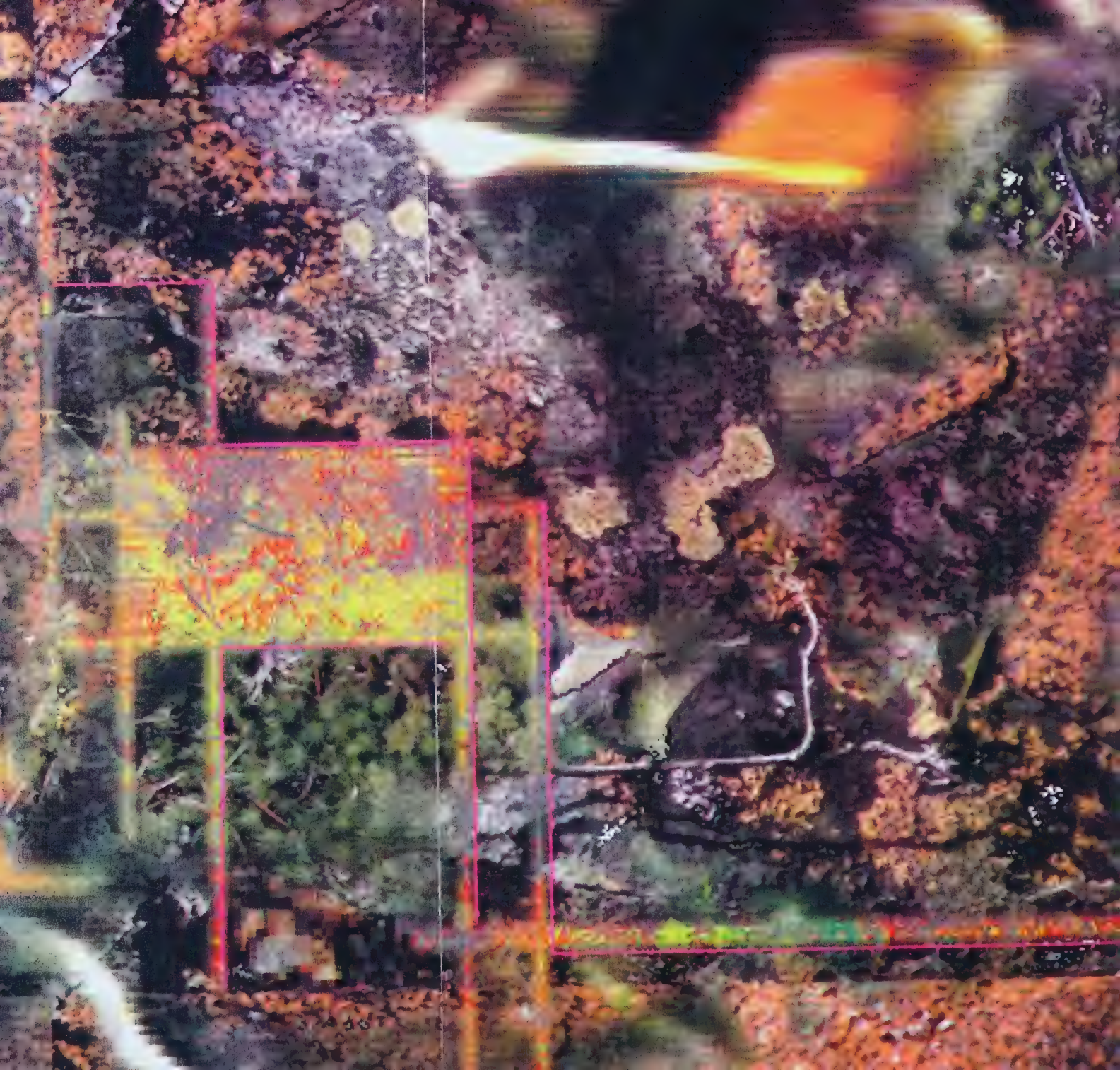
43

Ibid., pg., 18

visual communications. Originally used to designate designers of typography and printing, it now refers to a wide range of information design activity."³⁹ Designer, "one who conceives plans."⁴⁰ What is Art? Art is "a means of expressing and communicating ideas and emotions."⁴¹ "Physical things deteriorate, art is strength of idea, not material. The idea is the form. After the conception, any form of communication expressive of the idea - pictorial, diagrammatic, symbolic, or verbal - is legitimate."⁴² "To evoke in oneself a feeling one has experienced, and having evoked it in oneself, then by means of movements, lines, colors, sounds, or forms expressed in words, so to transmit that feeling that others may experience the same feeling, that is the activity of art."⁴³

■ Designers communicate a predetermined message and artists communicate a personal message. As designers, during the process of design, we draw on artistic creativity and personal expression to solve a visual problem. The initial message that we are asked to communicate is not a personal message, but the means with which we solve it, is a personal





solution appropriate to the problem. The motivation which stimulated my images was a personal excitement for the medium. The resulting images address significant concepts of form and content which I wanted to communicate using the computer medium. They are also records of moments of "artmaking" which were dear to me. "Art is the Attainment of a State of Feeling: The object of painting a picture is not to make a picture - however unreasonable this may sound. The picture, if a picture results, is a by-product and may be useful, valuable, interesting as a sign of what has passed. The object, which is back of every true work of art, is the attainment of a state of being, a state of high functioning, a more than ordinary moment of existence. In such moments activity is inevitable, and whether this activity is with brush, pen, chisel, or tongue, its result is but a by-product of the state, a trace, the footprint of the state. These results, however crude, become dear to the artist who made them because they are records of states of being which he has enjoyed and which he would regain. They are likewise interesting to others because they are to some

extent readable and reveal the possibilities of greater existence."⁴⁴ My images are a result of episodes of experimental activity with a group of images relating to each theme. For example, experimenting with a video of a creek and several still photographs of plants. . . recolouring, stretching, layering. The image acts as a record of this process as well as piece of visual communication.

Artists and Computers

The use of machines to produce art has been questioned since the use of cameras in the 19th century. The argument can be narrowed to one query. Does the machine provide freedom of visual expression? If a tool "machine" provides freedom of expression to an artist, how is it different from a tool such as a paint brush? A painter has the freedom to choose from many types of brushes all of which produce a different mark. The computer painter also has the freedom to choose from a wide variety of brushes. The skill with which the painter or computer painter can make a variety of marks from his tools is a result of experimentation

with the medium. Experience with the medium begins the development of a personal language with the tool. The artist has the freedom to choose the means by which to visualize his personal expression. Each medium whether it be watercolour painting, oil painting, collage, printmaking, sculpture, or computer imaging has its unique language. "The introduction of a new medium cannot ensure that a work employing it will be automatically more relevant and affecting than works in more traditional methods and materials. Nor does the use of 'old-master' techniques ensure that a contemporary work will have greater artistic merit than images formed in nontraditional modes."⁴⁵

The limitation of artistic expression is, as with any other artists tool, the limitation of the artist's creativity. When Man Ray was asked *Is Photography Art?* by L'Art Vivant Magazine in 1928 he answered, "I painted until the age of thirty. I was a professional painter. If I have chosen to make photographs, it is because I find this process just as flexible as painting, and more manageable. You can obtain any results you want if you know how to regulate the light, make enlargements, and prepare and

⁴⁵
Barrons, Janus, Man Ray: The Photographic Image, Educational System Inc., New York, 1980, pg., 85.

handle the solutions. Everything can be transformed, distorted, eliminated by light. Its flexibility is the same as that of the paintbrush."⁴⁶

■ There are numerous ways that artists are using computers, some of which are: visualization of mathematical formula; as a sketch pad for two and three dimensional art to be produced in other mediums; exploration with colour; programming individualized software; and electronic collage. Many artists using the computer praise similar capabilities of the medium.

■ Sharmon Liao, a commercial artist from California discusses the computer's wealth of color and textures, "I like to take advantage of the unique resources of the medium - the bright, saturated quality of transmitted colour, and the paint commands that alter isolated areas and pixels."⁴⁷ She also appreciates the "speed and change" it allows.

■ Diane Fenster, an illustrator from San Francisco discovered that computer technology provided her with an opportunity to manipulate, edit and expand the collage/montage format she felt most suited her personal

artistic expression. "My work is a combination of myth, spirit, science and technology. One thing I love about computers is a lot of spontaneous things happen. Some use computers because they're very exacting, I like to explore the hidden, spontaneous qualities so colours fill in unexpectedly. It's like working magic."⁴⁸

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Fenster, Diano, "Best of Show",
HOW, July/August 1991, Volume
VI, Number 5, pg., 108.

■ Clement Mok a graphic designer from Baltimore discusses the experimentation potential urged by the computer, "The fact that hyper-media is so easily manipulated and modified means that there is not a finite phase where one of our demonstrations is really finished. There's always the potential for revision, for adding animation or sound."⁴⁹

⁴⁹
Coupland, Ken, Clement Mok:
After the Revolution, Print,
November/December, 1989,
pg., 141.

■ James Towning a graphic designer and Musician from Ohio points out the similarity of sound and image in the digital environment. "The parallels you can draw between electronic music and electronically-generated graphics are very strong. I really started noticing these parallels ever since designers started scanning images. Sometimes I think of my music as bitmapped music - low resolution, jagged edged sounding music. The idea of scanning images is in the same mindset as sampling

sounds; the only difference is the medium that you're working in. But both methods make it possible to easily manipulate and collage. Laying out a page is pretty much like laying out a sequence of events that make up a song."⁵⁰

50

VanderLans, Rudy, "Sound Design", Emigre #16, pg., 2.

■ On the topic of universality April Greiman, a graphic designer from Los Angeles, states that "perhaps the most profound implication for the future is that computer technology collapses all media into a single desktop tool speaking one digital language. It is really a single metamedium. A sound is generated, edited, and remembered as a unique pattern of the same computer 'bits' that describe a color. A word is a color is a sound is a movement. The new significant media are hybrids. The age of the specialist is replaced by the age of the dedicated generalist."⁵¹ She also discusses the electronic library the computer provides. "The computer permits the entering of imagery from still photographs, slides, drawings, and freeze-frames from video, live or pre-recorded, into a stored library, ready to respond to the user. This library, together with the painting and image manipulation tools in the paintboxes, becomes a powerful 'light table of the mind' in

51

Greiman, April, Hybrid Imagery, Watson-Guptill Publications, New York, 1990, pg., 57.

which complex images may be built swiftly, recomposed, rethought, retouched, rejected, and refound. All this is accomplished on the screen in front of you, immediately.

Everything's always alive."⁵²

■ **There is a new generation of designers and artists that are using the computer as much more than a tool replacing old technology. The universal digital language which the computer provides interprets information from a multi disciplinary platform.**

■ Sound, in the form of music, spoken words and motion are stored in the same *on or off* language as text and image on the electronic medium. It is possible to combine a visual image of a word with its written counterpart. Once information is stored in this digital language distortion, colouring, layering . . . can be experimented with. **Immediate real-time feedback allows exploration of an endless number of possibilities.**

52

Greiman, April, *Hybrid Imagery*,
Watson-Guption Publications,
New York, 1990, pg. 56.



■ It is with ease that the computer allows experimentation with a library of images from a multidisciplinary platform. More solutions to a problem can be explored in less time, with greater ease. The result, a new language based on a multidisciplinary platform which provides designers and artists with a toolbox and library of endless possibilities.

Equipment Setup

Computer with an Intel 80386 33 MHz central processor with 4 megabytes RAM

120 megabyte IDE (hard drive)

VGA multisync colour monitor with 1024 x 768 pixel resolution

VGA 16 bit 512 Kb card linked to a NTSC to Targa conversion video card with 512K x 512K video RAM

300 dpi x 300 dpi postscript printer with 3 megabytes of RAM

QMS thermal printer

Iris printer

hand held 16 grey scale scanner

Nikon slide scanner

NTSC video cassette recorder (VCR)

8mm Video colour camera

coloured NTSC monitor

Hasselblad 2 1/4" square camera

mouse

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